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Sub SpecBATTERY CHARGER NOTABLY FOR A PORTABLE TELEPHONEFIELD OF THE INVENTION

The present invention relates to a battery charger, notably for a portable telephone.

5 BACKGROUND INFORMATION

A certain number of units in current use, such as portable telephones, are powered by batteries which have to be recharged at regular intervals. The different types of units are equipped with batteries with very diverse features,  
10 notably for the charge parameters which are the charge voltage and the charge current as well as for the geometry of the link connector. For example, portable telephone models are numerous and generally include batteries, with connector and charge parameter characteristics differing from one model to  
15 another.

The charge parameters and the connector geometry thus characterize a battery charger forming a set adapted to each unit model. This leads to the existence of many types of chargers. The rapid development of unit models leads to the  
20 purchase of a battery charger for each new model. This situation causes unnecessary expenses.

Adjustable battery chargers which may deliver different charge voltage and/or current values are conventional. However, they need to be adjusted by the user which is an  
25 obstacle to their use on the one hand, and on the other hand, the connector is connected to the charger via a cable which in practice cannot be removed from the unit, this cable ending with a connector which also cannot be removed from the cable.

Thus, despite the possibility of changing the electric  
30 charge parameters, the devices are only adapted to a single type of unit, or to a limited number of unit types.

It is an object of the present invention to provide to the user of battery units, an easy-to-use charger which may be used for several types of units.

5     SUMMARY

10     The present invention provides a charger, with variable charge parameters and of fitting this charger with an element for connecting to the unit, this element being removable from the charger and of providing an arrangement outside the  
15     charger, for automatic determination of the electrical parameters of the charge upon connecting the unit to the charger via the connection element.

20     In an example embodiment of the present invention, the arrangement for automatic determination of the charge  
25     parameters is integral with the connection element.

30     Alternatively, this determination arrangement is located in the battery unit.

35     Thus, a user or a distributor of chargers may have only one charger (or type of charger) and a plurality of connection elements, each of the latter being adapted to a unit model.

40     In an example embodiment of the present invention, the connection element includes a first connector for cooperating with a complementary connector of the unit and extended with a cable ending with a second connector for connecting to the  
45     charger.

50     In this case, if the arrangement which automatically determines the charger parameters is located in the connection element, this arrangement may be installed in the cable and/or in the first and/or second connector.

55     In one example embodiment of the present invention, the arrangement for automatic determination of parameters includes at least one electronic component such as a resistor or one connection such as a simple connection wire, which, upon connecting the unit to the charger, forms a component  
60     (element) of a circuit of the charger determining the charge parameter(s).

Alternatively, the component(s) or the element (or the elements) such as resistors, is (are) physically contained in the battery unit and the electrical connection cable connecting the unit to the battery charger includes at least one conductor per element (or item) in addition to the conductors for the charge.

The present invention therefore relates to a battery charger that includes an element for connecting to the unit, the battery of which is to be charged, which is characterized in that its charge parameters are variable, in that the connection element is removable from the charger, and in that it includes an arrangement, outside the charger, providing automatic determination of the electrical parameter(s) of the charge upon connecting the unit to the charger via the connection element.

The arrangement for automatic determination of the charge parameter(s) is, for example, located in the connection element.

This arrangement includes, in one example embodiment of the present invention, at least one electronic component, such as a resistor.

According to one example embodiment of the present invention, the arrangement for determination of the charge parameter(s) is located in the connector of the connection element which is for cooperating with a complementary connector of the charger.

The arrangement for automatic determination of the charge parameter(s) may also be located in the cable of the connection element or in a connector for cooperating with a complementary connector of the unit to be charged.

The present invention also relates to a battery charger which is characterized in that it includes an arrangement for varying the charge parameters and in that it includes at least one input for receiving an element or signal for determining these parameters.

For example, the input for receiving a signal which determines the parameter(s) of the charge, forms an input of a

connector for cooperating with a complementary connector of an element for connecting to the unit to be charged.

The present invention also relates to a connection element for connecting a battery charger to a battery unit, which is characterized in that, as it is removable from the charger, it includes at least one component for determining, in the charger, the charge parameter(s) of the battery unit to which it is intended to be connected.

In this connection element, the arrangement for determining the charge parameter(s) includes, according to one example embodiment of the present invention, at least one electronic component, such as a resistor, the terminals of which are to be connected to the charger via the connector of this connection element.

The present invention also relates to a battery unit which may be connected to a battery charger through a connector which is characterized in that it includes an arrangement for automatically determining the electrical parameters of the charge generated by the charger upon connecting the unit to the charger via the connector.

This battery unit, for example, includes one (or several) electronic component(s), such as a resistor or a connection, connected to a pair of terminals and which thus by connection belongs to the electrical circuit of the battery charger and determine(s) the charge parameters of the charger.

Other features and advantages of the invention will become apparent with the description of certain example embodiments, the latter being made with reference to the appended drawings.

#### BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a schematic view of the set, according to the present invention, of a battery charger and a battery unit connected through a connection cable.

Figure 2 is a schematic view of the set, according to the present invention, of a battery charger and of a cable connector on the charger side.

DETAILED DESCRIPTION

A battery charger is functionally formed by an electronic circuit, connected at the input with the mains or a battery of max. 48 volts, which delivers to a unit with a battery to be recharged, generally via a connection cable, charge parameters, such as voltage and current, the latter being determined by the value of the components of the circuit.

In the example embodiment of the present invention, these components for adjustment are positioned in a removable element such as the connection cable provided with two connectors, each of these components is connected to a pair of terminals of the connector, e.g., on the charger side, and inside the charger each pair of terminals is connected at the position provided for the component in the circuit diagram.

Thus, the charger may be used for charging miscellaneous units, the cable being specific to each unit.

The battery charger 2, illustrated in Figure 1, has a connector with two input terminals 4, adapted for the mains. The battery charger 2 is connected to the unit 6, the battery of which is to be charged, through a cable 8 including a plurality of conductors and ending on the charger side with a removable connector 10 for cooperating with a complementary connector fixed onto the charger. Cable 8 is fitted, on the battery unit side, with a second connector 12 for cooperating with a complementary connector mounted on unit 6.

The battery charger 2 is illustrated in Figure 2 in a version adapted for the mains as a power source. It contains an electronic circuit illustrated as blocks, notably including a rectifier block 13 delivering DC voltage to a high frequency chopping circuit 14 which powers an isolating transformer 16, the output of which is connected to two terminals 18 and 20 of the output connector of the charger.

The charge parameters, current and voltage, delivered on terminals 18 and 20 are determined by a voltage reference signal 24 and by a current reference signal 26. The values of the reference signals depend on the values of resistors 28 and 30, respectively, located on connector 10 and connected to the

electronic circuit of the battery charger through connection terminals 34, 36 and 38, 40. The reference signals of elements 24 and 26 are transmitted to the chopping circuit 14 through an optocoupler 22.

5           Thus, the connection of the connector 10 to the battery charger particularizes this charger and enables it to deliver on the output terminals 18 and 20, the charge parameters adapted to the battery unit.

10           In an alternative example embodiment of the present invention, the battery unit transmits a signal representing the charge parameters which are transmitted through the removable connection cable to the battery charger which therefore includes an input for receiving these signals and an arrangement for adapting the charge parameters to the received  
15           signal.